

Claims

1. A communication system (100) including a first central station (101), a plurality of remote units (103), and a frequency spectrum for providing communication services to the plurality of remote units, the communication system comprising:
- means for transmitting between the first central station (101) and a first remote unit (103) in a first portion (203) of the frequency spectrum in a first direction using a first transmission scheme;
- and the communication system being characterised by comprising:
- means for transmitting simultaneously between the first central station (101) and a second remote unit in the first portion (203) of the frequency spectrum in a second direction using a second transmission scheme.
2. A communication system as claimed in Claim 1 characterised by said first transmission scheme using spread energy signals and said second transmission scheme using concentrated energy signals.
3. A communication system as claimed in Claim 1 characterised by said first transmission scheme using a substantially time continuous signal with low power variation, and said second transmission scheme using a time discontinuous signal with high peak power during transmission bursts.
4. A communication system as claimed in Claim 1 characterised by the use of a Time Division Multiple Access (TDMA) scheme in said first direction and Code Division Multiple Access (CDMA) in said second direction.
5. A communication system as claimed in Claim 1 characterised by the use of an Orthogonal Frequency Division Multiple Access (OFDMA) scheme in said first direction and Code Division Multiple Access (CDMA) in said second direction.
6. A communication system as claimed in Claim 1 characterised by a second portion (201) of said frequency spectrum being dedicated to communication in said first direction and a third portion (205) of said

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frequency spectrum being dedicated to communication in said second direction.

7. A communication system as claimed in claim 6 further including a controller (305) for allocating users characterised by comprising:

5 a) means for estimating a distance from said first central station to said plurality of remote units (103);

b) means for allocating channels to the furthest of said plurality of remote units (103) in said first portion (203) of the frequency spectrum for communicating in said first direction and in said third portion (205) of the frequency spectrum for communicating in said second direction; and

10 c) means for allocating channels to the closest of said plurality of remote units (103) in said first portion (203) of the frequency spectrum for communication in said second direction and in said second portion (201) of said frequency spectrum for communicating in said first direction.

8. A communication system as claimed in Claim 1 characterised by said first transmission scheme using broadband signals (401) with low spectral energy density and said second transmission scheme using narrowband signals (403) with high spectral energy density.

9. A communication system as claimed in Claim 8 characterised by said broadband signals (503) being unevenly spread signals.

25 10. A communication system as claimed in Claim 8 characterised by further comprising means for selectively removing said narrowband signals (403) when receiving said broadband signals (401).

30 11. A method for communication in a communication system (100) including a first central station (101), a plurality of remote units (103), and a frequency spectrum for providing communication services to the plurality of remote units, the method comprising the steps of:

transmitting between the first central station (101) and a first remote unit (103) in a first portion (203) of the frequency spectrum in a first direction using a first transmission scheme; and the method being characterised by comprising the step of:

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transmitting simultaneously between the first central station (101)
and a second remote unit in the first portion (203) of the frequency spectrum
in a second direction using a second transmission scheme.

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